

## CLAIMS

The invention claimed is:

- 1     1.     Lightweight, structurally integral, and strong composite rack shelving, comprising:  
2           a shelf;  
3           wherein said shelf comprises a honeycomb core;  
4           wherein said shelf comprises an upper skin;  
5           wherein said shelf comprises a lower skin;  
6           wherein said honeycomb core of said shelf is sandwiched between said upper skin of  
7           said shelf and said lower skin of said shelf so as to form a composite structure;  
8           wherein said composite structure of said shelf is lightweight;  
9           wherein said composite structure of said shelf is strong;  
10          wherein said shelf has a plurality of through bores;  
11          wherein said plurality of through bores pass vertically through said shelf; and  
12          wherein said plurality of through bores through said shelf allow flames under said  
13          shelf to pass upwardly therethrough instead of sidewardly therealong whereby an  
14          extinguishant thereabove can pass downwardly therethrough for extinguishing flames  
15          thereunder.
- 1     2.     The shelving as defined in claim 1, wherein said shelf has a surface area; and  
2           wherein said plurality of through bores through said shelf occupy approximately 50%  
3           of said surface area of said shelf.

- 1     3.     The shelving as defined in claim 1; further comprising a border;  
2           wherein said shelf has a periphery; and  
3           wherein said border closes off said periphery of said shelf.
- 1     4.     The shelving as defined in claim 3, wherein said honeycomb core of said shelf  
2           comprises walls; and  
3           wherein said walls of said honeycomb core of said shelf define cells.
- 1     5.     The shelving as defined in claim 4, wherein said border is a tape that is affixed to any  
2           wall of said honeycomb core of said shelf that it comes in contact with, especially any  
3           that defines an open cell of said honeycomb core of said shelf located at said periphery  
4           of said shelf so as to maintain structural integrity of said shelf by closing off any open  
5           cell of said honeycomb core of said shelf located at said periphery of said shelf and  
6           form a structurally integral unit with said shelf, and which folds over to be affixed to  
7           said upper skin of said shelf and said lower skin of said shelf.
- 1     6.     The shelving as defined in claim 4; further comprising inserts; and  
2           wherein said inserts line said plurality of through bores through said shelf,  
3           respectively.
- 1     7.     The shelving as defined in claim 6, wherein said inserts are tapes that are affixed to  
2           any wall of said honeycomb core of said shelf that they come in contact with,  
3           especially any that defines an open cell of said honeycomb core of said shelf caused  
4           by a through bore through said shelf so as to maintain structural integrity of said shelf  
5           by closing off any open cell of said honeycomb core of said shelf caused by a through

6 bore through said shelf and form a structurally integral unit with said shelf, and which  
7 fold over to be affixed to said upper skin of said shelf and said lower skin of said shelf.

- 1 8. An improved rack system of the type having columns, beams interconnected to the  
2 columns, and shelving supported by the beams, said improvement comprising:
- 3 a) the shelving being lightweight;
  - 4 b) the shelving being structurally integral;
  - 5 c) the shelving being strong;
  - 6 d) the shelving comprising a shelf;
  - 7 e) said shelf comprising a honeycomb core;
  - 8 f) said shelf comprising an upper skin;
  - 9 g) said shelf comprising a lower skin;
  - 10 h) said honeycomb core of said shelf being sandwiched between said upper skin  
11 of said shelf and said lower skin of said shelf so as to form a composite  
12 structure;
  - 13 i) said composite structure of said shelf being lightweight;
  - 14 j) said composite structure of said shelf being strong;
  - 15 k) said shelf having a plurality of through bores;
  - 16 l) said plurality of through bores passing vertically through said shelf; and
  - 17 m) said plurality of through bores through said shelf being for allowing flames  
18 under said shelf to pass upwardly therethrough instead of sidewardly  
19 therealong and an extinguishant thereabove to pass downwardly therethrough  
20 and extinguish the flames thereunder.

- 1     9.     The improved rack system as defined in claim 8, wherein said shelf has a surface area;  
2           and  
3           wherein said improvement comprises said plurality of through bores through said shelf  
4           occupying 50% of said surface area of said shelf.
- 1     10.    The improved rack system as defined in claim 8, wherein said improvement comprises:  
2           a)     said shelf having a periphery;  
3           b)     the shelving comprising a border; and  
4           c)     said border closing off said periphery of said shelf.
- 1     11.    The improved rack system as defined in claim 10, wherein said improvement  
2           comprises:  
3           a)     said honeycomb core of said shelf comprising walls; and  
4           b)     said walls of said honeycomb core of said shelf defining cells.
- 1     12.    The improved rack system as defined in claim 11, wherein said improvement  
2           comprises said border being a tape that is affixed to any wall of said honeycomb core  
3           of said shelf that it comes in contact with, especially any that defines an open cell of  
4           said honeycomb core of said shelf located at the periphery of said shelf so as to  
5           maintain structural integrity of said shelf by closing off any open cell of said  
6           honeycomb core of said shelf located at the periphery of said shelf and form a  
7           structurally integral unit with said shelf, and which is folded over to be affixed to said  
8           upper skin of said shelf and said lower skin of said shelf.

1     13.     The improved rack system as defined in claim 11, wherein said improvement  
2             comprises:  
3             a)     the shelving comprising inserts; and  
4             b)     said inserts lining said plurality of through bores through said shelf,  
5                   respectively.

1     14.     The improved rack system as defined in claim 13, wherein said improvement  
2             comprises said inserts being tapes that are affixed to any wall of said honeycomb core  
3             of said shelf that they come in contact with, especially any that defines an open cell of  
4             said honeycomb core of said shelf caused by a through bore through said shelf so as  
5             to maintain structural integrity of said shelf by closing off any open cell of said  
6             honeycomb core of said shelf caused by a through bore through said shelf and form a  
7             structurally integral unit with said shelf, and which are folded over to be affixed to said  
8             upper skin of said shelf and said lower skin of said shelf.